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CONTENTS

Brown—Status of two carpenter ants 157

Van Pelt—Orasema in nests of Pheidole 161

Alexander—Western crane-flies. Part XI 163

Rehn—Aquatic insects of the Brandywine 171

Tuthill—South American Psyllids 178

Current Entomological Literature 179

Review

Mathematical Biophysics 188

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ENTOMOLOGICAL NEWS

VOL. LXI NOVEMBER, 1950 No. 6

The Status of Two Common North American Carpenter Ants

By WILLIAM L. BROWN, JR., Biological Laboratories, Harvard University

In his recent book, "Ants of North America," Dr. W. S. Creighton has made a very important advance in the taxonomy of the familiar carpenter ants belonging to the *Camponotus* (s. str.) *herculeanus* group. Among the chief points of interest in this treatment is the recognition of the synonymy of *herculeanus* var. *whymperi* with the "typical" *herculeanus*. This synonymy will no doubt be applauded by sensible myrmecologists, for no one has ever been able to show any morphological differences between the Eurasian and North American populations.

Dr. Creighton has also raised the common eastern *pennsylvanicus* to separate specific status, and I think his evidence for this move is strong enough to deserve the support of all workers. Furthermore, a number of variants that have managed to persist in the literature are exposed as synonyms, mostly based on insufficient or poorly preserved material. In this one publication, Dr. Creighton has presented ant taxonomy, in *Camponotus* and other groups, with the most prodigious act of unscrambling that has yet been performed on this or any other continent. His work will undoubtedly form the bedrock systematics for all future work on Nearctic ants, and changes to be made during the "morphological" period of our labors will be largely in the nature of retouches of this single contribution.

To the present author, two of the most important, yet still relatively minor, corrections that should be made lie with the forms Creighton has called *Camponotus pennsylvanicus modoc*

Wheeler and *C. pennsylvanicus ferrugineus* (Fabricius). I am convinced that neither form can be placed as a subspecies of *pennsylvanicus.*

Camponotus herculeanus modoc Wheeler

In my opinion, *modoc* is much more logically treated as a southern race of *herculeanus* than as a western race of *pennsylvanicus. Modoc* ranges widely in the mountains of the western United States and in subboreal regions of the Pacific Northwest, and its northern limits roughly meet the southern low altitude limits of *herculeanus herculeanus* in a broad belt near the Canadian Border. Specimens stemming from this broad region seem to intergrade between the two subspecies, although the material I have seen could certainly stand supplementation through further collections. *Modoc* can be distinguished from the northern and alpine form in that the reddish color of the propodeum and petiole has been replaced by black, so that *modoc* is concolorous black except for the legs. Also, the gastric pubescence of *modoc* tends to be a little longer, often surpassing the posterior borders of the gastric segments in the middle. These relatively pubescent specimens were thought by Wheeler to represent intergrades between *modoc* and *pennsylvanicus*, and it is possible that Dr. Creighton is following this line of thought. A reexamination of *modoc, pennsylvanicus,* and *h. herculeanus* specimens, common in most collections in this country, should convince most workers that the interpretation given here has the better chance of being correct.

Camponotus ferrugineus (Fabricius)

This form is completely blanketed distributionally by the range of *pennsylvanicus.* Morphologically, it differs from *pennsylvanicus* (so far as anyone has been able to tell) only in color. This color difference, however, is quite striking, and there are no recorded instances of difficulty in distinguishing *ferrugineus* in the field. Dr. Creighton's treatment of this ant is extraordinary in that he has allowed it to remain as a subspecies of *pennsylvanicus* in spite of the complete and exceed-

ingly detailed sympatry shown by the two forms. His aberrant procedure has, I believe, been forced by the conflict of his belief in sympatry and lack of intergrades as reliable specific criteria on the one hand, and his profound distrust of color as the same sort of criterion on the other.

By his own taxonomic principles, Dr. Creighton will eventually have to resolve this dilemma for himself. Meanwhile, I feel confident in proposing that *ferrugineus* be raised to separate specific rank. The prospect of considering the striking color difference as the sole morphological point of differentiation so far discovered does not disturb me in the least, even though I realize that other species of the same group (in Europe and Asia) are extremely variable in coloration. The major taxonomic fact supporting this view, and one recognized by Dr. Creighton, is the lack of known intergradient color forms connecting the two species. This fact has been noted by several authors, and it appears to hold true even in areas where nests of the two forms may be only a few feet apart. The flight time of the sexual phases frequently coincides to the day, at least in Pennsylvania and eastern Massachusetts, so that ample opportunity is probably presented for interbreeding.

To allow, therefore, for the possibility of the cospecificity of the two forms, one would have to postulate that the genetic factor or factors controlling color would operate on an "all-or-none" basis in this case. Furthermore, the random association of queens of mixed origins should certainly result in mixed pleometrotic nests if such an "all-or-none" theory is to be accepted. No mixed nests are known in nature.

There is a biological difference that will aid in separating the two as species. In areas where they occur together, *pennsylvanicus* is usually the more common species. While it will accept a rather wide range of nest sites, *pennsylvanicus* (in the area of sympatry) as found in relatively undisturbed forest areas nearly always nests in standing timber. This standing timber may be partially rotten or largely sound. Dr. Creighton's belief that the tunnels of this ant are driven only into decaying parts of the sound timbers or standing trees is certainly incorrect, as

has been shown abundantly in the literature both for *pennsylvanicus* (cf. Townsend, 1945, for bibliography) and for *herculeanus herculeanus* (cf. Eidmann, 1928). Dr. R. B. Friend, Connecticut State Entomologist and one who has extensively investigated ant damage to telephone poles in his state, assures me that *pennsylvanicus* can and will tunnel extensively in sound poles there. I myself have watched for long periods at a living sycamore tree housing a colony of *pennsylvanicus* at Philadelphia. The sawdust brought out and dropped to the base of the tree by the ants was large in amount, and in periods of great tunnelling activity was creamy white in color, the shade of new sawdust fresh from the saw. It seems probable that the original entrance to the interior of the tree is often or always forced through a decayed or otherwise damaged place, however, and it is true that *pennsylvanicus* will also nest in wholly or partially decayed wood. Nests of *pennsylvanicus* (in the sympatric zone) are rarely made in "red-rotten" logs or stumps, and the soil itself is rarely penetrated by the galleries.

In these respects, *ferrugineus* differs sharply, for its nests are almost invariably in or beneath rotten logs at the punky "red" stage. The galleries, in all of the many nests I have seen, penetrate the soil beneath the log or stump to considerable depths. Often the major population of the nest will be found in the subterranean chambers, and if the log be removed, the colony will often stay on living underground at the same spot. Anyone who cares to survey the biological statements concerning *ferrugineus* in the various state lists and similar sources will find that this ant behaves in an essentially similar fashion throughout its range. Perhaps the coloration is an adaptation to nesting in this reddish environment, and the same is possibly true of *C. noveboracensis* (Fitch), a more boreal species also commonly found in red-rotten logs and stumps.

The combined color differences and ethological peculiarities, and also the distributional considerations, leave little alternative to considering *ferrugineus* as a good and separate species.

REFERENCES CITED

CREIGHTON, W. S. 1950. Ants of North America. Bull. Mus. Comp. Zool., 104: cf. pp. 363–370.

EIDMANN, H. 1928. Zur Kenntnis der Biologie der Rossameise (*Camponotus herculeanus* L.). Zeitschr. f. angewandte Ent. Pp. 229–253, 9 figs.

TOWNSEND, L. H. 1945. Literature of the black carpenter ant, *Camponotus herculeanus pennsylvanicus* (Degeer): A bibliography with abstracts. Kentucky Agr. Exp. Sta. Circular 59, 27 pp.

Orasema in Nests of Pheidole dentata Mayr (Hymenoptera: Formicidae)

By ARNOLD F. VAN PELT,[1] University of Florida, Conservation Reserve, Welaka, Florida

Within the past few years, two instances of parasitism were found within the nests of *Pheidole dentata* Mayr. In one case the parasites were determined by Mr. A. B. Gahan of the United States National Museum as the chalcid *Orasema robertsoni* Gahan, and in the other case Mr. Gahan determined the parasites as *Orasema* sp., possibly *robertsoni* Gahan. In the latter case insufficient material was available for specific determination.

The first parasitized colony was collected in the Welaka Reserve of northeastern peninsular Florida on September 19, 1949. This nest was in a hardwood stump in mesic hammock (*Magnolia grandiflora—Ilex opaca* association). The number of ants within the nest was 174, including 12 soldiers. Unparasitized pupae and larvae were present, along with an almost equal number of parasitized immatures.

Many different sizes of *Orasema* larvae were found, ranging from small insignificant points on the ant pupae or larvae, through a characteristic striped stage, to the late stage larvae with vesiculate knobs on its lateral borders. All were attached to the anterior portion of a *Pheidole* larva or pupa (fig. 1, A).

[1] Contribution of the Department of Biology, University of Florida, Gainesville.

Different size *Orasema* pupae were also discovered (fig. 1, B). These pupae, when they first drop from the ant host, are enclosed in a vesiculate skin, and only later do they become fully formed. There were four fully formed pupae counted within the present nest, and three of these were pigmented. Similar stages of *O. viridis* are well illustrated by Wheeler (1910: 415).

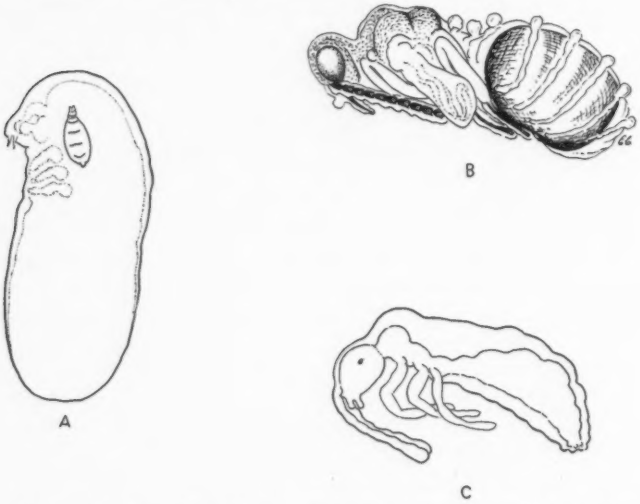

FIG. 1. A, *Pheidole* larva with an *Orasema* larva attached anteriorly; B, fully formed and pigmented *Orasema* pupa; C, phthisergate of *Pheidole* worker.

The other case of parasitism was observed in a nest of *Pheidole dentata* Mayr taken about six miles north of Gainesville, Florida. The colony, collected on October 12, 1946 from a longleaf pine (*Pinus palustris*) log in the late stages of decay, occurred in a longleaf pine flatwoods (*Pinus palustris-Aristida stricta* association). It is noteworthy that both parasitized nests were taken in the fall.

Many deformed phthisergates, or worker pupae which have, through *Orasema* parasitism, lost the necessary body fluids to

develop correctly, were present in both nests (fig. 1, C). No phthisogynes, or similarly affected female pupae, were observed, but several parasitized female larvae were found. According to Wheeler (1910: 418) the ant larvae parasitized by *Orasema* are in many cases able to pupate, but the affected pupae are unable to emerge.

The writer wishes to express his appreciation to Mr. A. B. Gahan for his determinations of *Orasema* and to Miss Esther Coogle for the drawings which appear in this paper.

LITERATURE CITED

WHEELER, W. M. 1910. Ants, their structure, development, and behavior. Columbia University Press, New York.

Undescribed Species of Crane-Flies from the Eastern United States and Canada (Dipt.: Tipulidae). Part XI

By CHARLES P. ALEXANDER, Amherst, Massachusetts

The preceding part under this title was published in ENTOMOLOGICAL NEWS, 57: 245–252, 1946. The species discussed herewith are chiefly from materials in the Zoological Museum of the University of Michigan, having been sent to me for examination by the Director, Dr. James Speed Rogers. Additional species from other sources are acknowledged in the text.

Tipula (Lunatipula) polingi n. sp.

♂. Length about 15 mm.; wing 16 mm.; antenna about 5 mm. Closely allied and generally similar to *Tipula* (*Lunatipula*) *flavocauda* Doane, differing in details of coloration of the wings and structure of the male hypopygium.

Wings with a faint brownish tinge, cells *C* and *Sc*, stigma and the prearcular field darker yellowish brown; vein *Cu* and adjoining part of cell *M* not or scarcely darker. In *flavocauda*, the stigma is darker and there is a darkened seam in cell *M* adjoining vein *Cu*.

Male hypopygium with the outer tergal lobes obliquely truncated, the outer apical angle obtusely rounded, the sclerotized margin microscopically roughened, the inner angle not or scarcely produced into a spine. Outer basal lobe of the inner dististyle produced into two powerful spines from a common base, the spines slightly unequal, the outermost a little longer and slightly less acute at apex. Gonapophysis virtually as in *flavocauda*. Eighth sternite with the outer lateral blade elongate, obtuse at apex.

Habitat.—TEXAS. *Holotype:* ♂, Brewster County, June 1926 (O. C. Poling); University of Michigan.

The fly is named for the well-known collector of insects, the late Mr. O. C. Poling. The typical form of *flavocauda* Doane is found in southern Arizona and adjacent areas, in the vicinity of Tucson being the commonest representative of the genus during the spring months. In New Mexico, an evidently allied species, *Tipula* (*Lunatipula*) *stalagmites* Alexander, is found. The fly described herewith is the most easterly member of the group. It is possible that all three flies may be considered as subspecies in a relatively restricted chorocline, with *flavocauda* being the typical form and oldest name.

Limonia (Dicranomyia) immanis n. sp.

Allied to *cramptoniana*, differing especially in the structure of the male hypopygium; ninth tergite large, the posterior border shallowly emarginate, lateral lobes conspicuous, with long yellow setae; basistyle and ventral dististyle very complicated by outgrowths; gonapophyses not setuliferous; aedeagus without spines.

♂. Length about 7.5–8 mm.; wing 7–8 mm.
♀. Length about 8 mm.; wing 8 mm.

Described from the type specimen that is mounted on a microscope slide. Rostrum and palpi brown. Antennae brown, the scape darker; flagellar segments oval, the terminal one pointed, more than one-half longer than the penultimate. Head dark brown; anterior vertex relatively broad, exceeding three times the diameter of the scape.

Thorax almost uniformly dark brown, variegated with paler on the dorsopleural and meral regions. Halteres with stem pale, knob weakly darkened. Legs with the coxae brownish yellow; trochanters yellow; remainder of legs brown, the femoral bases more brightened. Wings whitish subhyaline; stigma oval, brown, relatively conspicuous; veins brown. Venation: Sc_1 ending opposite origin of *Rs*, Sc_2 some distance from its tip, Sc_1 nearly three-fourths as long as *Rs;* inner end of cell R_3 lying basad of that of cell *1st* M_2*; m* relatively short, less than *r–m; m–cu* a short distance before the fork of *M*.

Abdomen more or less bicolored; tergites brown, sternites brownish yellow, their bases more infuscated; outer segments, including the hypopygium, more uniformly darkened. Male hypopygium with the tergite large, transversely rectangular, the posterior border with a broad and shallow emargination; lateral lobes conspicuous, tipped with long yellow setae; median tergal area slightly produced into an oval knob provided with about 15–16 long setae. Proctiger apparently divided into two roughly oval plates or blades, the apex more produced, microscopically spiculose, the roughenings continuing around the margin but more reduced. Basistyle with the ventromesal lobe very complex, comprised chiefly of a large flattened blade that is generally oval or triangular in outline, with ridges or crests, the surface with abundant setae; near base of blade with a cylindrical darkened lobe that bears a group of strong setae at apex. Dorsal dististyle a sinuous slender rod, the apex an acute spine. Ventral dististyle in total area subequal to the basistyle and its lobe, very complex in structure; on face of style near base with an oval tubercle and a much longer stout lobe, its tip obtuse; on lower margin of style, just cephalad of the rostral prolongation, with a flattened lobe that is fringed with long yellow setae; rostral prolongation with two straight black spines, arising close together at the narrowed part of a triangularly dilated outer rostral portion; just basad of the spines with a long slender tail-like lobe, both ends of which are hairy, the lower end and nearest the spines obtuse, with a conspicuous brush of setae; outer portion of this lobe narrowed to the subacute tip, the outer third

with abundant long erect pale setae. Aedeagus relatively slender, the outer third with erect short setae, the dorsal surface with two ridges that bear conspicuous spinous points for most of the length of the organ. Gonapophysis with the mesal-apical lobe stout, the surface with abundant microscopic setulae.

Habitat.—MICHIGAN. *Holotype:* ♂, mounted on microscope slide, Lake County, October 7, 1947 (J. Speed Rogers); Rogers Number 3583.

In addition to the holotype, the University of Michigan Collection includes the following specimens, which may be considered as being homotypical or paratypical: 2 ♂♂, 2 ♀♀, with the type and bearing the same field number; 2 ♂♂, on slides, Schoolcraft County, September 22, 1940; 2 ♂♂, 6 ♀♀, Iosco County, October 18 and 19, 1947, Nos. 18, 19 and 22; 3 ♂♂, 2 ♀♀, Ontario, York County, October 8, 1940, No. 8 (all J. Speed Rogers).

The most similar described species is *Limonia* (*Dicranomyia*) *cramptoniana* (Alexander), which has all details of the male hypopygium quite distinct, particularly the tergite, lobes of the ventral dististyle, gonapophysis and aedeagus. The male hypopygium of *cramptoniana* has been figured by the writer (Alexander, Diptera of Connecticut, fig. 35, B, 1942).

Limonia (Dicranomyia) michigana n. sp.

Allied to *magnicauda broweriana*, differing especially in the structure of the male hypopygium; ninth tergite large, the caudal margin very slightly emarginate; ventromesal lobe of the basistyle unusually large and complex; ventral dististyle of about the same size as the basistyle, unusually complicated by outgrowths, particularly the rostral prolongation.

♂. Length about 8–10 mm.; wing 7–8.5 mm.
♀. Length about 9–10 mm.; wing 7.5–8.5 mm.

Described from the type specimens, mounted on a microscope slide.

Rostrum, palpi and antennae dark brown; flagellar segments oval; terminal segment about one-third longer than the penultimate. Head dark brown.

Thorax almost uniformly dark brown (on slide). Halteres pale, knob weakly more darkened. Legs with coxae and trochanters pale; remainder of legs dark brown, the femoral bases more brightened; claws (male) unusually simple, with one distinct but small basal tooth and an even less evident more basal spur. Wings subhyaline; stigma oval, pale brown, very poorly indicated; veins brown. Venation: *Sc* short, Sc_1 ending opposite to some distance before the origin of *Rs*, in extreme cases the distance between the two veins approximately one-fourth the length of *Rs*; Sc_1 alone from one-third to one-fourth *Rs*; *m–cu* at or close to fork of *M*.

Abdomen dark brown, the incisures narrowly pale; hypopygium chiefly darkened, the ventral dististyle paler. Male hypopygium unusually large and complicated in structure. Ninth tergite large, only slightly transverse, the caudal margin very shallowly emarginate; lateral lobes low, with unusually long and abundant setae, at the summit of the lobe forming a loose brush; median region of tergite with a central furrow, near the posterior end of which is a small oval pocket bearing about six long setae. Proctiger large and well-developed, the lateral borders blackened and sclerotized, the apex paling into thin membrane. Basistyle of moderate size, the ventromesal lobe unusually large and complex, including a major blackened clavate structure, the margin of which is weakly notched and bearing a strong outer point, basad of which are a double series of spines, the outer ones directed slightly distad, the more basal series with the comb of teeth directed more cephalad; near base of lobe with a further stout clavate structure that bears numerous long setae. Dorsal dististyle a slender and relatively weak rod, nearly straight, narrowed to an acute point. Ventral dististyle about equal in size and complexity to the basistyle, on outer margin near base produced into a long sinuous rod that gradually widens to the subtruncate hairy tip; on inner face of style and possibly to be construed as being an apical lobe of the basistyle is a smaller lobe that is more expanded outwardly so as to appear more or less palmate, the margin with numerous strong spinous setae. Rostral prolongation unusually complex, comprised of two main branches, the more basal one more or less split

or divided at apex into two arms, one nearly glabrous, the other bearing several setae and bristles at apex; upper branch of the prolongation with the usual two spines placed at and before mid-length, beyond the outer spine very gradually narrowed to the subobtuse tip; spines oblique in position, directed outwardly, subequal in size; at base of prolongation on the disk of the style with a conical darkened lobe that bears several very long setae. Gonapophysis with the mesal-apical lobe slender, relatively small and weak, the tip curved, the margin irregularly crenulate. Aedeagus slender, straight, the tip weakly bilobed.

Habitat.—MICHIGAN. *Holotype:* ♂, mounted on microscope slide, Livingston County, Edwin S. George Reserve, November 1, 1948. (J. Speed Rogers). *Paratopotype:* ♂, mounted on slide with the type.

In addition to the types above mentioned, the University of Michigan Collection includes the following specimens, which may be considered as being homotypical or paratypical: More than 60 ♂♂, 40 ♀♀, from the type locality, between June 18 and November 1, especially on the latter date but with records for July, August and October. Further material from Livingston, Washtenaw, and Iosco Counties, the last taken October 18 from a low wet grassy alder thicket. This is *Limonia* (*Dicranomyia*) species 37-A as recorded by Rogers in his fine report on the crane-flies of the George Reserve (Univ. Michigan, Mus. of Zoology, Misc. Publ. 53: 1–128, 8 pls., map, 1942; reference on page 85); here the species is recorded as being apparently very local but numerous in two areas of wet grass-sedge-fern and shrub-sedge marsh in the big swamp of the George Reserve.

The fly is closest to *Limonia* (*Dicranomyia*) *magnicauda broweriana* Alexander, differing conspicuously in the structure of the male hypopygium. I wish to express my great indebtedness to Professor Rogers for the privilege of describing the present species and many others that he has collected in the past.

Atarba (Atarba) bellamyi n. sp.

Thorax almost uniformly brownish yellow, unpatterned, the pleura very vaguely more pruinose; antennae with the flagellar segments bicolored, chiefly black, the proximal fourth or less

of the segments yellow, the amount of pale color decreasing on the outer segments; abdomen obscure yellow, weakly to scarcely darkened before the hypopygium; male hypopygium with the outer dististyle on margin with only three major spines, the apical point long and slender; aedeagus unusually small and slender.

♂. Length about 4.5–5 mm.; wing 4.8–5.5 mm.; antenna about 2.5–4 mm.

Rostrum chestnut brown; palpi black. Antennae (male) unusually variable in length, as shown by the measurements; scape and pedicel yellow, flagellar segments bicolored, chiefly black, with the proximal fourth or less yellow, the amount of this latter color decreasing in amount on the outer segments, the outermost being uniformly blackened; flagellar segments long-cylindrical; verticils unilaterally distributed, much longer than the erect pale shorter setae. Head brownish yellow.

Thorax almost uniformly brownish yellow, unpatterned, the pleura very vaguely more pruinose. Halteres with stem pale, knob infuscated. Legs with the coxae and trochanters yellow; femora yellow, the extreme tips blackened; tibiae and tarsi yellow, the outer segments of the latter brownish black; tibial spurs small pale. Wings with the ground brownish yellow, the prearcular and costal fields clearer yellow; veins brownish yellow. Venation: Sc_1 ending opposite or just beyond the origin of *Rs*, this vein about as long as *Rs* or the basal section of R_5; anterior branch of *Rs* gently sinuous; cell R_4 about two and one-half times as wide at margin as cell R_2; *m–cu* about one-third to one-half its length beyond the fork of *M*.

Abdomen obscure yellow, weakly to scarcely darkened before the reddish yellow hypopygium. Male hypopygium with the appendage of the ninth sternite very short and broad, the outer apical angles extended laterad into acute spines. Outer dististyle on outer margin with only three major spines, the outermost largest, placed at near three-fifths the length of the style; the other spines are widely separated, with a few accessory microscopic denticles; apical point long and slender, with a further spine on lower margin just back of the apex. Gonapophysis pale, without spinous points. Aedeagus unusually small and slender.

Habitat.—FLORIDA, GEORGIA. *Holotype:* ♂, Welaka, Putnam County, Florida, on U. S. Fisheries Tract, at light-trap No. 3, July 1–2, 1946 (R. E. Bellamy); Collector's No. 1525; returned to Bellamy. *Paratopotypes:* 3 ♂♂, with the type; 1 ♂, July 26, 1946; Bellamy No. 1605. *Paratype:* ♂, Neel Gap, Union County, Georgia, July 5, 1947 (P. W. Fattig).

I am most pleased to name this very distinct fly for the collector, Dr. R. Edward Bellamy, who has done important work on the crane-flies of Florida. The species is entirely distinct from the only other eastern species, the genotype *Atarba* (*Atarba*) *picticornis* Osten Sacken, and also from the species in Cuba and the southwestern states. The most evident distinctions are found in the coloration of the antennae and abdomen, and in the structure of the male hypopygium, particularly the outer dististyle and aedeagus. The occurrence of the species in the mountains of northern Georgia was quite unexpected and indicates a much wider range for the fly than is known at this date.

Erioptera (Mesocyphona) femora-atra n. sp.

Allied to *caloptera;* size relatively small (wing, female, under 4 mm.); mesonotal praescutum buffy, with two broad black longitudinal stripes; femora black, the bases and a narrow ring at near three-fifths the length yellow, remainder of legs yellow; wings brown, spotted and dotted with white, the dark color much exceeding the pale in extent.

♂. Length about 3.4–3.5 mm.; wing 3.6–3.7 mm.

Rostrum and palpi black. Antennae with scape and pedicel black, more or less variegated with paler; basal segments of flagellum pale yellow, the outer ones passing into brown. Head buffy, the center of vertex dark brown.

Pronotum brownish black medially, the scutal lobes pale. Mesonotal praescutum buffy with two broad black intermediate stripes that are much broader than the median interspace, the latter slightly wider behind; lateral praescutal borders narrowly dark brown, crossing the suture behind onto the scutal lobes; intermediate praescutal stripes continued caudad, including the mesal portions of the scutal lobes; scutellum buffy;

postnotum darkened. Pleura dark brown, with a broad longitudinal silvery stripe. Halteres with stem whitened, knob dark brown. Legs with the coxae and trochanters obscure yellow; femora brownish black to black, with a narrow yellow ring at near three-fifths the length, the bases restrictedly obscure yellow; remainder of legs light yellow. Wings with the ground color brown, more saturated along the costal border, variegated by numerous white spots and dots, including a series of about seven along the anterior border, the second not reaching costa; fourth pale area continued across wing as a narrow, only slightly broken band that extends to vein *Cu;* all longitudinal veins behind and excepting R_5 with a white marginal spot; remaining cells of wings with scattered white spots; in brief, the pattern is dark with a much more restricted pale pattern; veins pale brown, pale in the white areas. Venation: Cell M_2 open by the atrophy of the basal section of M_3.

Abdomen chiefly dark brown.

Habitat.—GEORGIA. *Holotype:* ♀, Valdosta, Lowndes County, May 28, 1946 (P. W. Fattig). *Paratopotypes:* 2 ♀♀.

Although the present fly is generally similar to *Erioptera* (*Mesocyphona*) *caloptera* Say, it seems certainly to be distinct in the pattern of the legs and wings, as described. All three type specimens are virtually identical in the points indicated.

Notes on Some Aquatic Insects of the Brandywine Creek Drainage, Chester County, Pennsylvania

By JOHN W. H. REHN, Research Associate, Academy of Natural Sciences of Philadelphia

During 1948 a biological survey of the Conestoga Basin, Lancaster County, Pennsylvania, was carried on by the Academy of Natural Sciences of Philadelphia for the Sanitary Water Board of the Commonwealth of Pennsylvania. At this time a limited number of similar collections was made in the Brandywine Creek Drainage. As a result of the interest shown in stream pollution in the state, particularly in the Brandywine Drainage, it has

been thought advisable to present the small amount of information assembled during that season's work. In addition it is believed that some of the distributional records may be of interest to those working on the various groups of aquatic insects.

A basic report has recently been published on the survey of the Conestoga Basin,[1] but due to the limited character of that undertaken in the Brandywine Drainage none has been presented. The method of survey on this drainage was essentially the same as that utilized on the major survey, with the same technics, methods of sampling and recording.

It is desired to thank all of those that participated in the survey for their help in the accumulation of the material here presented.

All of the material listed represents immature individuals except in the Hemiptera and Coleoptera where the material is adult unless otherwise noted. Incomplete identifications are listed only as a help in establishing the various ecological associations present.

A listing of the various localities examined and the conditions encountered is given below. The densities at the stations are listed, as in the other stream survey report: (1) rare, (2) few, (3) frequent, (4) common, (5) very abundant.

Station A. Brandywine Creek, 2½ miles north of Coatesville. Average width 5 feet. Average depth 15 inches. Shores wooded lowland. Bed of stream some boulders, mainly gravel or sand and a little mud.

This station was first examined 23 July 1948 (A1) and a second time 13 August 1948 (A2). This is station 129 of the State Stream Survey.

Superficially this appeared to be a healthy station.

Station B. Brandywine Creek south of bridge at Coatesville. Average depth 19 inches. Shores weeds and industrial wastes. Bed of stream mainly rubble, some clay.

This station was first examined 21 July 1948 (B1) and a second time 11 August 1948 (B2). This is station 126 of the State Stream Survey.

[1] PATRICK, RUTH, A proposed biological measure of stream conditions, based on a survey of the Conestoga Basin, Lancaster County, Pennsylvania. Proceedings Academy of Natural Sciences of Philadelphia, CI, pp. 277–341, map, (1949).

This station was heavily contaminated with oil and at the time of the first examination no insects could be found.

Station C. Brandywine Creek at Modena. Average width 50 feet. Average depth 12 inches. Shores low vegetation. Bed of stream mainly gravel, with mud near the shores.

This station was first examined 21 July 1948 (C1) and a second time 13 August 1948 (C2). This is station 127 of the State Stream Survey.

This station was heavily contaminated with oil, but not as much so as B. In addition garbage and other wastes were also present.

Station D. Brandywine Creek at Embreeville State Hospital. Average depth 20 inches. Shores pasture, with cut banks. Bed of stream about one-half rubble and sand, remainder rock with a fine mud covering.

This station was first examined 21 July 1948 (D1) and a second time 16 August 1948 (D2). This is station 128 of the State Stream Survey.

Superficially this appeared to be a healthy station.

Station E. Brandywine Creek above Lenape. Average depth 13 inches. Shores mixed second growth. Bed of stream mainly rocks and rubble, a little mud near the banks.

This station was examined 13 August 1948 and is station 141 of the State Stream Survey.

This appeared to be a healthy station.

Station F. Brandywine Creek near Lenape. Average depth 19 inches. Shores mixed vegetation, banks cut. Bed of stream rubble to rocks except for mud near the shores.

This station was examined 13 August 1948 and is station 142 of the State Stream Survey.

At this station there was some traces of oil contamination.

ODONATA

Agrionidae

Agrion sp. A2 3, D2 2.
Hetaerina sp. D1 2, D2 2, E 1.5, F 2.

Coenagrionidae

Argia moesta (Hagen) A2 2.
Argia sedula (Hagen) A2 2.
Argia violacea (Hagen) A2 4, E 3.
Argia maculata? A1 2.5.
Enallagma sp. C1 2, C2 3.
Enallagma civile (Hagen) C1 3, D2 4.

Aeshnidae

Cordulegaster diastatops (Selys) D2 1.5.
Gomphinae E 1.5.
Hagenius brevistylus Selys A1 1.5, A2 1.5.
Gomphus descriptus Banks A2 3.5, F 2.5.
Gomphus exilis Selys A2 2.
Gomphus spiniceps (Walsh) or possibly *G. villosipes* Selys A1 2, D1 2, F 2.
Gomphus villosipes Selys D2 1.5.
Boyeria vinosa (Say) A1 2.5, A2 4, D1 2, D2 2.5, E 3, F 2.
Aeshninae E 2.
Aeshna umbrosa Walker C1 2, D2 2.

Libellulidae

Macromia sp. A1 3.
Macromia illinoiensis Walsh A2 1.5, D1 2, D2 2, F 2.
Macromia probably *illinoiensis* B2 3.
Somatochlora sp. C1 2, C2 3.
Plathemis lydia (Drury) C1 2.

EPHEMEROPTERA

Ephemeridae

Ephoron sp. A1 1.
Ephoron leukon Williamson A2 2.
Hexagenia atrocaudata McDunnough A1 4, A2 3.5.

Heptageniidae

Stenonema annexum Traver A1 4, F 3.2.
Stenonema candidum Traver A1 3.
Stenonema gildersleevei Traver A2 1.
Stenonema ithaca (Clemens & Leonard) A2 4.
Stenonema probably *ithaca* E 3.
Stenonema ohioense Traver A1 2, D1 2.
Stenonema pudicum (Hagen) A1 2.5, A2 2, D1 2.
Heptagenia sp. A1 1.5.
Heptagenia marginalis Banks A1 2, A2 2.
Iron humeralis (Morgan) A1 3, A2 4.

Baetidae

Baetidae A1 1.5.
Isonychia albomanicata (Needham) A1 4, A2 4.
Isonychia matilda Traver A1 3.
Ephemerella lata Morgan A1 2.5, A2 2, F 2.
Baetis sp. A1 2.
Baetis pygmaeus (Hagen) A2 2.
Pseudocloeon cingulatum McDunnough A1 3, A2 3.

PLECOPTERA

Perlidae

Perlesta placida (Hagen) A1 2.
Acroneuria arida (Hagen) A1 3.5, A2 3.
Acroneura internata (Walker) A2 2, F 2.
Acroneura ruralis (Hagen) A1 3.
Togoperla sp. A1 1.5, A2 3.5.

HEMIPTERA

Veliidae

Veliidae (sight records) A2 5, F 4.

Nepidae

Ranatra sp. A2 3.

Corixidae

Corixidae (sight records) A2 2.

NEUROPTERA

Corydalidae

Corydalus cornutus Linnaeus A1 3, A2 4, C1 2, D1 3, D2 2, E 4, F 2.
Nigronia sp. A2 2, D1 2.

COLEOPTERA

Haliplidae

Haliplidae (sight records) A2 2.

Dytiscidae

Dytiscidae (sight records) A2 2.5.

Gyrinidae

Gyrinidae (sight records) A2 3.

Parnidae s.l.

Larval water pennies A1 2, A2 2.5, D1 1.5.

TRICHOPTERA

Rhyacophilidae

Rhyacophila fuscula (Walker) A1 2.

Philopotamidae

Chimarra aterrima Hagen A2 1.

Psychomyiidae

Neuroclipsis sp. A1 2, A2 1.
Psychomyia sp. A1 1.5.

Hydropsychidae

Hydropsyche sp. A2 1.5.
Hydropsyche bifida complex A1 3, A2 4.
Hydropsyche simulans Ross A2 2, F 2.5.
Hydropsyche betteni Ross A2 1.5.
Cheumatopsyche sp. A1 3, A2 1.5, F 2.5.
Macronemum sp. A1 1.5.

Limnephilidae

Neophylax sp. A1 2.5.

Leptoceridae

Athripsodes sp. A of Ross A1 1.5.

DIPTERA

Tipulidae

Tipula sp. D1 2.

Simuliidae

Black flies F 2.

Chironomidae

Chironomidae—A1 1.5, A2 3.5, B2 3.5, C1 1.7, C2 2.5, D1 2.8, D2 3.2, E 2.5, F 2.5.

Tabanidae

Tabanidae D2 1.5.

Empididae

Roederiodes Coquillett? E 1, F 1.5.

LEPIDOPTERA

Pyralididae

Elophila sp. A1 1.5, D1 1.

The diversity of forms at the various stations appears to be of some interest. It should be noted that Chironomids are treated as a single entity. At station A, 58 different forms were found, 40 on the first and 41 on the second examinations. At station B, only two forms were found, both on the second examination, there being no insect life present at the time of the first examination. At station C, seven different forms were found, seven at the time of the first examination and only three at the second sampling. At station D, 18 different forms were found, with 13 types present at each sampling. At station E, 10 forms were found and at station F, 17.

When one examines the information for the various major groups as distributed from the headwaters, through pollution and downstream, the following conclusions can be made. The Odonata were well represented at A, practically absent from B, and then show a gradual increase in diversity and numbers downstream. The Ephemeroptera showed a good mixed fauna at A, and were absent from B. Downstream the families other than the Ephemeridae reappeared but in reduced variety and number. In the Plecoptera only the Perlidae were found at A, and members of this family were again encountered at F. Of the Neuroptera, *Corydalus* was the only common form and this soon returned following the heavy pollution. Of the Trichoptera five families, represented by six species, were found only at A, while the Hydropsychidae, which were moderately well developed at A, reappeared at station F. Neither the Hemiptera nor Coleoptera were sufficiently collected to warrant the drawing of any conclusions. Of the Diptera either insufficient material, as in most families, or incomplete determinations do not allow the forming of conclusions. It is interesting to note that the single aquatic lepidopteron, *Elophila*, was present in both stations A and D.

Taxonomic Notes on Two South American Psyllids (Homoptera)

By Leonard D. Tuthill, Department of Zoology and Entomology, University of Hawaii

As a result of study of several species of South American Psyllidae, mostly received from Senor Carlos A. Lizer y Trelles of Argentina, I am able to dissolve to some extent the confusion which has surrounded the nomenclatorial and taxonomic status of two of the species.

Genus **Gyropsylla** Brethes

1921 *Gyropsylla* Brethes, Revista de la Facultad Agronomia Universidad National de la Plata, Argentina 14: 87.
1925 *Metaphalara* Crawford, Broteria Ser. Zool. 22: 60.

Several specimens from the Territory of Missiones, Argentina determined as *Metaphalara spegazziniana* by Lizer, furnish confirmation of the close relationship of this species with *Psylla ilicis* Ashmead of North America as indicated by Lizer and Crawford. The latter erred however in erecting the genus *Metaphalara* for these two species and the related *cannela*. *Gyropsylla* is the valid name of the genus. The synonymy of the type species, *Gyropsylla spegazziniana* (Lizer), is as follows:

1919 *Paurocephala spegazziniana* Lizer, Marcellia, 16: 103.
1921 *Gyropsylla ilicicola* Brethes, Revista de la Facultad Agronomia Universidad National de la Plata, Argentina, 14: 88.
1925 *Metaphalara spegazziniana* Crawford, Broteria Ser. Zool., 22: 72.

Genus **Holotrioza** Brethes

1920 *Holotrioza Brethes*, Aspiraciones, *2*: 132.

The psyllid described by Scott in 1882 (Trans. Ent. Soc. London, 1882: 443) as *Psylla duvauae* was properly assigned to a genus other than *Psylla* by Brethes. In 1920 he erected a new genus, *Holotrioza*, for this species. This was done in a discus-

sion of galls formed on the host plant, *Schinus polygamus* (Cav.) Cabr. His choice of a name was unfortunate however, as the insect belongs to the subfamily Pauropsyllinae rather than to the Triozinae. As the genera of this subfamily are at present quite incompletely known and mostly poorly defined the exact relationship of this form within the subfamily is doubtful but it appears to be most closely related to *Pauropsylla*.

Several specimens collected at Buenos Aires by Lizer have been examined.

Current Entomological Literature

COMPILED BY R. G. SCHMIEDER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1950 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Bishopp, F. C.—Percy N. Annand, 1898–1950 (Obit.). [52] 10: 93. Leland Ossian Howard, 1857–1950 (Obit.). *Ibid.* 94. **Brues, C. T.**—The Salagubong gong, a Filipino insect toy. [73] 57: 26–28. **Chiang, H. C. and A. C. Hodson**—An analytical study of population growth in Drosophila melanogaster. [25] 20: 173–206. (See also under Anatomy.) **Freeborn, S. B., H. F. Gray, R. T. Legge and R. L. Usinger**—In memoriam William Brodbeck Herms, 1876–1949. [52] 10: 92–93 (portrait, in color). **Goux, L.**—Hivernation et diapause hivernale chez les coccides de la fauna française (Hom. Coccoidea), et remarques sur le déterminisme de la diapause. [Bull. Mus. d'Hist. Nat. Marseille] 3: 126–45, 1943. **Heikertinger, F.**—Über Fütterungsversuche mit Tagfaltern und Vögeln in

der Mimikryforschung. [Verh. Zool.-Bot. Ges., Wien.] 90/91: 5–25, 1944. **Johnson, C. G.**—The comparison of suction trap, sticky trap and tow-net for the quantitative sampling of small airborne insects. [Ann. Appl. Biol.] 37: 268–85. **Just, G.**—Zur Phylogenese von Anpassungs Charakteren. [Zool. Anz.] Suppl. 7: 126–33, 1934. **LeMoult, E.**—Limitation et subdivision de l'espèce et proposition de termes nouveaux. [Misc. Ent.] 43: 45–58, 1946. **Lindroth, C. H.**—August West, 11.8.1874–5.4.1949 (Obit.). [Ent. Tidskr.] 71: 79. **Thienemann, A.**—Die Binnengewässer. Bd. 18. Verbreitungsgeschichte der Süsswassertierwelt Europas. Pp. xvi, 1–809, 249 figs. E. Schweitzerbart, Stuttgart, 1950. **Tullgren, A.**—John Adam Peyron, 1870–1949 (Obit.). [Ent. Tidskr.] 71: 15–16 (portr.). **Tulloch, G. S.**—Alan Sloan Nicolay. (Obit.). [18] 45: 82. **Urquhart, F. A.**—The Kitto insect collection. [23] 82: 83. **Utida, S.**—On the equilibrium state in the interacting population of an insect and its parasite. (Curculionid and Pteromalid.) [26] 31: 165–75. **Vappula, N. A.**—Finnish entomological literature published in 1947, including economic entomology and control of insect pests. [Ann. Ent. Fennici] 15: 1–16, 1949. **Walker, E. M.**—Francis J. A. Morris (Obit.). [23] 82: 90–92.

ANATOMY, PHYSIOLOGY, MEDICAL—Abul-Nasr, S. E.—Structure and development of the reproductive system of some species of Nematocera (Diptera). [Phil. Trans. Roy. Soc., ser. B] 234: 339–96, ill. **Arnal, A.**—El aparato digestivo y la digestion en los culicidos hematofagos. [Trab. Inst. Cien. Nat. José de Costa., Ser. Biol.] 2: 307–64, ill. **Bair, T. D.**—Experimental determination of the autoselected temperature in the chicken louse, Cuclutogaster heterographus (Nitsch). [26] 31: 474–77. **Bourgogne, J.**—Un type nouveau d'appareil génital femelle chez les Lépidoptères. [107] 115 (1946): 69–80, ill., 1949. **Burla, H., A. Brito da Cunha, A. G. L. Calvacanti, Th. Dobzhansky and C. Pavan**—Population density and dispersal rates in Brazilian Drosophila willistoni. [26] 31: 393–404. **Chiang, H. C. and A. C. Hodson**—The relation of copulation to fecundity and population growth in Drosophila melanogaster. [26] 31: 255–59. (See also under General.) **Day, M. F.**—The occurrence of mucoid substances in insects. [Austral. Jour. Sci. Res.] Ser. B, 2: 421–27. **Dobzhansky, Th.**—Genetics of natural populations. XIX. Origin of hetereosis through natural selection in popu-

lations of Drosophila pseudoobscura. [Genetics] 35: 288–302. **Durand, M.-C.**—Contributions à l'étude de la gamétogenèse des Gryllidae. [C. R. Acad. Sci.] 230: 2335–36, ill. **Flanders, S. E.**—Regulation of ovulation and egg disposal in the parasitic Hymenoptera. [23] 82: 134–40. **Gorirossi, F. E.**—The mouth parts of the adult female tropical rat mite, Bdellonyssus bacoti (Hirst, 1913) Fonseca, 1941 [= Liponissus bacoti (Hirst)], with observations on the feeding mechanism. [46] 36: 301–18. **Grandori, L. e G. Reali**—Uso dei narcotici nello studio del meccanismo di azione del D.D.T. sugli insetti. [Boll. Zool. Agr. e Bachicolt., Torino] 16: 3–14. **Hadorn, E.**—Physiogenetische Ergebnisse der Untersuchungen an Drosophila-Blastemen aus letalen Genotypen. [Rev. Suisse Zool.] 57: 115–28. **Jolivet, P.**—Quelques remarques sur l'autohémorrhée chez les Timarcha (Col. Chrysom.). [Misc. Ent.] 43: 29–30, 1946. **Labeyrie, V. et R. Pons**—Sur l'importance de l'hydrométrie dans l'éthologie de la mouche de l'Oignon (Chortophaga antiqua). [C. R. Acad. Sci.] 230: 1983–84. **Leportois, M.**—Croissance ponderale et duree d'intermue chez Carausius morosus, Br. [Growth] 14: 1–5. **Lerner, A. B. and T. B. Fitzpatrick**—Biochemistry of melanin formation. [Physiol. Reviews] 30: 91–126. **Lewis, D. J.**—A peritrophic membrane in Simulium. [53] 165: 978. **Lewke, J.**—Zur Kenntnis der Wachsdrüsen der Honigbiene. [Anat. Anz.] 97: 265–68, ill. **Lindemann, W.**—Untersuchungen zur postembryonaken Entwicklung schweizerischer Orchesellen (Collembola). [Rev. Siusse Zool.] 57: 353–428. **Ludwig, D.**—Changes in the distribution of nitrogen during starvation in the grasshopper Chortophaga viridifasciata De G. [Physiol. Zool.] 23: 208–13. **Manning, F. J.**—Sex-determination in the honey bee. VII. [51] 8: 7. **Newton, J.**—Prolonged duration of the pupal stage in certain moths (Eriogaster). [29] 62: 49–50. **Oertel, E.**—Relative humidity and temperature within the beehive. [37] 42: 528–31. **Pavan, M.**—Studi sugli antibiotici di origine animale. IX. Sui rapporto fra estratti di Formicidae, acido formico e alcuni formiati. [Atti Soc. Ital. Sci. Nat. Mus. Civ., Milano] 88: 136–41, 1949. **Pradhan, K. S.**—On the physiology of digestion in the larva of the woolly bear, Anthrenus fasciatus Herbst (Dermest.). [Jour. Zool. Soc. India] 1: 107–19, 1949. **Qadri, M. A. H.**—External and internal anatomy of the buffalo louse, Hematopinus tuberculatus. Aligarh Muslim University Publications, Zoological Series, 1948. 21 pages, ill., Price Rs 3. On the morphology and

post-embryonic development of the male genitalia and their ducts in Hemiptera. [Jour. Zool. Soc. India] 1: 129–43, ill., 1949. **Rockstein, M.**—Glycogen metabolism in insects: A review. [18] 45: 74–81. **Scott, T. L.**—Bee anatomy. Sect. 5, pt. 4. Blood, Nassanoff's glands, ovaries. [51] 8: 8–14. **Silvo, O.**—Tests on the capacity for cellulose digestion of Tribolium (Aphanotus) destructor Uytt. (Col., Tenebr.). (English summary.) [Ann. Ent. Fennici] 15: 135–38, 1949. **Stradal-Schuster, H.**—Aussenverdauung bei Spinnen. [Verh. Zool.-Bot. Ges., Wien] 90/91: 83–128, 1944. **Strickland, M.**—Differences in toleration of drying between species of termites (Reticulotermes). [26] 31: 373–85. **Tulloch, G. S. and J. E. Shapiro**—The microtrichiae of Uranotaenia (Culicidae). [18] 45: 72–73, ill. **Valadares, M. et F. Charconnet-Harding**—Influence du tryptophane alimentaire sur la pigmentation des yeux de Drosophila melanogaster. Cas de la mouche sauvage et du mutant vermillion. [C. R. Acad. Sci.] 231: 76–77. **Vance, A. M.**—Some physiological relationships of the female European corn borer moth in controlled experiments. [37] 42: 474–84. **Waterhouse, D. F.**—The hydrogen ion concentration in the alimentary canal of larval and adult Lepidoptera. [Austral. Jour. Sci. Res.] 2: 428–37. **Wenig, K.**—Mechanismus Tkáňového dýchání u hmyzu. [Časopis Čs. Spol. Ent.] 46: 85–98, 1949.

ARACHNIDA AND MYRIOPODA—Brennan, J. M. and G. W. Wharton—Studies on North American chiggers. No. 3. The subgenus Neotrombicula. [1] 44: 153–197, ill. **Causey, N. B.**—Variations in the gonopods of a Xystodesmid Diplopod. [1] 44: 198–202, ill. **Chamberlin, R. V.**—Neotropical chilopods and diplopods in the collections of the Department of Tropical Research, New York Zool. Soc. [95] 35 (10): 133–44. **Gorirossi, F. E.**—Acarina. (See under Anatomy.) **Hoffman, R. L.**—Records and descriptions of Diplopods from the southern Appalachians. [Elisha Mitchell Sci. Soc.] 66: 11–38, 8 pls. **Kohls, G. M.**—Ticks (Ixodoidea) of the Philippines. [Nat. Inst. Health Bull.] No. 162. **Ovazza, M.**—Quelques observations sur la biologique et plus particulièrment le cycle de Liponyssus bacoti. [Ann. de Parasit.] 25: 178–87. **Souza Lopes, H. de e J. N. Macedo**—Sôbre a presença de Otocentor nitens no vale do Rio São Francisco, Brasil (Acarina, Ixodidae). [111] 10: 58–64. **Stradal-Schuster, H.**—(See under Anatomy.) **Wallace, H. K.**—On Tullgren's Florida spiders. [31] 33: 71–83 (*), ill.

SMALLER ORDERS—Bair, T. D.—Anoplura. (See under Anatomy). **Carriker, M. A., Jr.**—Studies in neotropical Mallophaga. VIII. "Ischnocera" of the American "Psittacidae," Part 2. Genus Paragoniocotes Cummings. [111] 10: 1–21. **Chopard, L.**—Dermaptera. (See under Anatomy.) **Eichler, W.**—Über die endoparasitische Lebensweise der Kormoran-Federlinge (Mallophaga). [Riv. di Parass.] 11: 103–08. **Emerson, K. C.**—The genus Lagopoecus (Philopteridae: Mallophaga) in North America. [43] 23: 97–101, ill. **Guppy, R.**—Biology of Anisolabis maritima (Gene) the seaside earwig, on Vancouver Island (Dermaptera). [Proc. Ent. Soc. Brit. Col.] 46: 14–18. **Hack, W. H.**—Nota sobre un Colémbolo de la Antártida Argentina (Achorutes viaticuss). [Notas del Mus. de la Platte] 14 (Zool. No. 126): 211–12, ill., 1949. **Holland, G. P.**—Notes on some British Columbian fleas, with remarks on their relationship and distribution. [Proc. Ent. Soc. Brit. Col.] 46: 5–13. Notes on Megabothris asio (Baker) and M. calcarifer (Wagner) with the description of a new subspecies (Siphonapt., Ceratophyllidae). [23] 82: 126–33, ill. **Jameson, E. W., Jr.**—Catallagia mathesoni, a new Hystrichopsyllid flea (Siphonaptera) from California. [43] 23: 94–96, ill. **Judd, W. W.**—Aggregations of the snow-flea, Achorutes socialis Uzel (Collembola) recurring over three years. [23] 82: 84–85. **Knowlton, G. F., S. C. Ma and D. L. Wray**—Collembola in northern Utah celery fields. [18] 45: 96. **Lindemann, W.**—Collembola. (See under Anatomy.) **Miller, E. M.**—A handbook on Florida termites. [Univ. of Miami Press, Tech. Ser.] 1–30, ill., 1949. **Needham, J. G.**—Three new species of North American dragonflies, with notes on related species (Odonata). [83] 76: 1–12. **Qadri, M. A. H.**—Anoplura. (See under Anatomy.) **Ross, H. H. and D. R. Merkley**—The genus Tinodes in North America (Trichoptera). [43] 23: 64–67 (k), ill. **Strickland, M.**—Isoptera. (See under Anatomy.) **Tjeder, B.**—Neuroptera from the Azoren and Madeira. [Soc. Sci. Fenn., Comm. Biol.] 8 (13): 1–12. **Nybom, O.**—The Trichoptera from the Atlantic Islands. [Soc. Sci. Fenn., Comm. Biol.] 8 (14): 1–19. **Valle, K. J.**—Odonaten von den Azoren. [Soc. Sci. Fenn., Comm. Biol.] 8 (5): 1–7. **Wray, D. L.**—Some new Collembola from Utah and Idaho. [18] 45: 91–95, ill.

ORTHOPTERA—Chopard, L.—Insectes Orthoptéroides (Blattidae, Mantidae, Gryllidae, Phasmidae, Dermaptera) récoltés dans les iles atlantiques. [Soc. Sci. Fenn., Comm.

Biol.] 8 (4): 1–13. **Durand, M.-C.**—(See under Anatomy.) **Liebermann, J.**—Sobre una coleccion de acridoideos neotropicales del Dr. Richard Ebner, con la descripcion del alotipo de Diponthus bilineatus Rehn. [111] 10: 133–39. **Salmon, J. T.**—A revision of the New Zealand wetas—Anostostominae (Orthoptera: Stenopelmatidae). [Domion Mus. Rec. Ent.] 1 (8): 121–77, ill. **Uvarov, B. P.**—Tettigoniidae and Acrididae collected in 1931 on the Atlantic Islands by R. Frey and R. Storå. [Soc. Sci. Fenn., Comm. Biol.] 8 (15): 1–7.

HEMIPTERA—Beamer, R. H.—The genus Bakerelle in North America north of Mexico (Fulgoridae). [43] 23: 102–09 (k), ill. **Beamer, R. H. and C. D. Michener**—Mutual relationships between leafhoppers and ants (Cicadell.) [43] 23: 110–13. **Beirne, B.**—A new species of Balclutha, with notes on the Canadian Balcluthini (Cicadellidae). [23] 82: 123–26 (k). **Goux, L.**—(See under Anatomy.) **Gressitt, J. L. and Y. W. Djou**—Introduction to the study of citrus scale insects and their biological control in China. [Lingnan Nat. Hist. Soc.] Special Publ. No. 13. **Hottes, F. C.**—A long lost Aphis species. [60] 26: 93–94. **Hungerford, H. B.**—On the distribution of Notonecta petrunkevitchi Hutchinson (Notonectidae). [43] 23: 93. **Hussey, R. F. and J. L. Herring**—A remarkable new Belostomatid from Florida and Georgia. [31] 33: 84–89, ill. **Knowlton, G. F.**—Neosyndobius aphids. [18] 45: 71. Calaphis coloradensis. *Ibid.* 86. Two aphis records. *Ibid.* 89. **Lindberg, H.**—Die Hemipteren der Azorischen Inseln. [Soc. Sci. Fenn., Comm. Biol.] 8 (8): 1–32. **Pflugfelder, O.**—Psyllina. H. G. Bronns Kl. Ord. Tierreichs. Bd. 5, Arthropoda, 3 Abt.: Insecta, VIII Buch, Heil bγ. Pp. 95, ill. **Qadri, M. A. H.**—(See under Anatomy.) **Wygodzinsky, P.**—Sôbre alguns Emesinae (Reduviidae). [111] 10: 73–84 (*), ill.

LEPIDOPTERA—Bernardi, G.—Revision de la classification des espèces holartiques des genres Pieris Schr. et Pontia Fabr. (Pieridae). [Misc. Ent.] 44: 65–80. **Bourgogne, J.**—(See under Anatomy.) **Chermock, R. L.**—A generic revision of the Liminitini of the world (Nymphalidae). [1] 43: 513–69 (k), ill. **Dufrane, A.**—A propos de Danaus (Limnas Hbn.) chrysippus L. (Danaidae). [Misc. Ent.] 45: 49–51, 1948. **Franclemont, J. G.**—On the identity of Therina fervidaria Hübner (Geom., Ennom.). [18] 45: 90. **Hardy, G. A.**—Notes on the life-history of the Garry

oak looper, Lambdina fiscellaria somniaria (Geomet.). [Proc. Ent. Soc. Brit. Col.] 46: 13–14. **Heikertinger, F.**—(See under General.) **Lange, W. H., Jr.**—Biology and systematics of plume moths of the genus Platyptilia in California. [Hilgardia] 19: 561–668, ill. **Lesse, H. de and P. Viette**—Expéditions polaires Françaises. Campagne 1949 au Groenland. Zoologie. Première Note: Microlepidoptera. [107] 115: 81–92, ill., 1949. **McDunnough, J. H.**—Two unrecorded homonyms in the genus Euxoa (Phalaen.). [18] 45: 84. **McElvare, R. R.**—A new Heliothid from New Mexico. [18] 45: 83–84, ill. **Muma, M. H. and R. E. Hill**—Thaumatopsis pectinifer (Zell.) injurious to corn in Nebraska. [43] 23: 79–83, ill. **Newton, J.**—(See under Anatomy.) **Rebel, H.**—Die Lepidopterenfauna des Azorischen Archipels. [Soc. Sci. Fenn., Comm. Biol.] 8 (1): 1–62, 1940–49. **Vance, A. M.**—(See under Anatomy.) **Viette, P.**—Contribution à l'étude des Hepialidae sur quelques espèces Sud-Américaines. [107] 116: 73–81 (*), ill., 1949.

DIPTERA—Abul-Nasr, S. E.—(See under Anatomy.) **Alexander, C. P.**—Undescribed species of Tipulidae from the western United States. IV. [60] 26: 81–85. **Arnal, A.**—(See under Anatomy.) **Barnes, R. C., H. L. Fellton and C. A. Wilson**—An annotated list of mosquitoes of New York. [52] 10: 69–84. **Carpenter, S. J.**—Notes on mosquitoes in North America: I. Distribution records for the eastern United States during 1946 and 1947. [52] 10: 64–65. **Carrera, M.**—Synoptical keys for the genera of Brazilian Asilidae. [111] 10: 99–111. **Downs, W. G.**—Morphological notes on Anopheles aquasalis and A. oswaldoi. [52] 10: 29–30. **Fellton, H. L., R. C. Barnes and C. A. Wilson**—New distribution records for the mosquitoes of New England. [52] 10: 84–91. **Frey, R.**—Tiergeographische Studien über die Dipterenfauna der Azoren. [Soc. Sci. Fenn., Comm. Biol.] 8 (10): 1–118. Die Dipterenfauna der Insel Madeira. *Ibid.* 8 (16): 1–47. **Frost, S. W.**—Results of the Pennsylvania survey for 1948. [52] 10: 65–68. **Gregson, J. D.**—Additional notes on the life-history of Cuterebra tenebrosa Coq. [Proc. Ent. Soc. Brit. Col.] 46: 3–4. **Hull, F. M.**—New species of New World Volucella. [18] 45: 65–71. **James, M. T.**—The Diptera collected on the Cockerell and Hubbell expeditions to Honduras. I. Stratiomyidae, Tabanidae, and Acroceratidae. [60] 26: 86–90. **Judd, W. W.**—Mosquitoes collected in the vicinity

of Hamilton, Ontario during the summer of 1948. [52] 10: 57–59. **Knowlton, G. F. and L. E. Fronk**—Some locality records of Utah Heleidae. [43] 23: 113–14. **Lane, J.**—New Brazilian Leia Meigen, 1818 (Mycetophilidae). [111] 10: 121–31. **Lewis, D. J.**—(See under Anatomy.) **Middlekauff, W. W. and L. W. Quate**—New distribution records for some nearctic Tabanidae. [60] 26: 95–96. **Moilliet, T. K.**—Some preliminary observations on the life-history of Cuterebra tenebrosa Coq. [Proc. Ent. Soc. Brit. Col.] 46: 1–3. **Rempel, J. G.**—A guide to the mosquito larvae of western Canada. [24] 28 (sect. D): 207–48, ill. **Rueger, M. E. and S. Druce**—New mosquito distribution records for Texas. [52] 10: 60–63. **Sabrosky, C. W.**—A new species of Eribolus from California (Chloropidae). [60] 26: 91–92. **Séguy, E.**—La biologie des diptères. [Encyclopédie Ent.], Sér. A, 26: 1–609. **Shaw, F.**—A new Brazilian Leia (Mycetophilidae). [111] 10: 113–14. **Tulloch and Shapiro**—(See under Anatomy.) **Vargas, L.**—Nota sobre la distribucion holarctica del grupo maculipennis y del subgenero Coelodiazesis. Missirolimya, nov. subg. de Anopheles (Culicidae). [Riv. di Parass.] 11: 73–84.

COLEOPTERA—Arnett, R. H.—Generic names of the beetle family Oedemeridae and their type species. [48] 40: 217–25, ill. **Balch, R. E. and G. R. Undergood**—The life-history of Pineus pinifoliae (Fitch) (Phyloxeridae) and its effect on white pine. [23] 82: 117–23, ill. **Benesh, B.**—Descriptions of new species of stagbeetles from Formosa and the Philippines. [60] 26: 51–59, ill. **Bernhauer, M.**—Staphyliniden von den Azoren und Madeira. [Soc. Sci. Fenn., Comm. Biol.] 8 (2): 1–10, 1940–49. **Blake, D. H.**—A new genus of flea-beetles from the West Indies. [73] 57: 10–25 (k), ill. **Edwards, E. E.**—Observations on the biology of Corymbites cupreus F. (Elateridae). [Ann. Appl. Biol.] 37: 249–59. **Edwards, J. G.**—A bibliographical supplement to "Coleoptera or beetles east of the great plains" applying particularly to western United States. Publ. by the author, San Jose State College, Cal., 1950. Pp. 183–212. **Fisher, W. S.**—A revision of the North American species of beetles belonging to the family Bostrichidae. [U. S. Dept. Agric., Miscell. Publ.] No. 698: 1–157. **Green, J. W.**—The Lycidae of the United States and Canada. II. The tribe Lygistoperini. [83] 76: 13–25, ill. **Hardy, G. A.**—Notes on Vancouver and west coast Coleoptera (Carab., Lucan., Ceramb.). [Proc. Ent. Soc. Brit.

Col.] 46: 18. Notes on, and additions to the Cerambycidae of Vancouver Island. [23] 82: 85–86. **Hincks, W. D.**—The odd beetle, Thylodrias contractus (Dermest.). in Britain. [28] 86: 148. The Spaeth collection of Cassidinae (Chrysom.). *Ibid.* 144–46. **Jolivet, P.**—A propos des variations du doryphore (Leptintarsa decemlineata Say) (Chrysom.). [Misc. Ent.] 43: 31–33, 1916. Le réflexe d'enfouissement chez Leptinotarsa et Timarcha. *Ibid.* 38–39. (See also under Anatomy.) **Lepesme, D.**—Révision des Dermestes (Dermestidae). [107] 115: 37–68, ill., 1949. **McKey-Fender, D.**—Notes on Cantharis III. [60] 26: 61–79. **d'Orchymont, A.**—Palpicornia des Acores et Madeira. [Soc. Sci. Fenn., Comm. Biol.] 8 (3): 1–4, 1940–49. **Peyerimhoff, P. de**—Études sur le systématique des Coléopères du Nord-Africain. Ann. Soc. Ent. Fran. 114: III (1) Les Rhizotrogus (Scarab.). [107] 114: 1–76, 1949. **Patay, R.**—A propos de l'évolution nymphale de l'intestin moyen de Macrodytes marginalis L. [Bull. Soc. Sci. Bretagne] 23: 25–44, 1949. **Pradhan, K. S.**—(See under Anatomy.) **Sanderson, M. W.**—New North American Phyllophaga (Scarab.). [43] 23: 90–93, ill. **Saulnier, C.**—Remarques brèves sur le genre Acritus Le Conte (Hist.). [Misc. Ent.] 43: 40–41, 1946. Le genre Aeletes Horn (Hist.) est-il suffisament défini? *Ibid.* 41–42. **Utida, S.**—(See under General.) **Uyttenboogaart, D. L.**—Coleoptera (excl. Staph. et Hydroph.) con de Azoren und Madeira. [Soc. Sci. Fenn., Comm. Biol.] 8 (12): 1–15.

HYMENOPTERA—Beamer and Michener—(See under Hemiptera). **Brown, W. L.**—Supplementary notes on the feeding of Dacetine ants. [18] 45: 87–89. Revision of the ant tribe Dacetini: II. Glamyromyrmex Wheeler and closely related small genera. [83] 76: 27–36. **Buckell, E. R.**—Records of bees from British Columbia: Megachilidae. [Proc. Ent. Soc. Brit. Col.] 46: 21–31. **Buckell, E. R. and G. J. Spencer**—The social wasps (Vespidae) of British Columbia. [Proc. Ent. Soc. Brit. Col.] 46: 33–40. **Conde, O.**—Tenthredinoidea von Madeira und den Azoren. [Soc. Sci. Fenn., Comm. Biol.] 8 (18): 1–2. **Dreisbach, R. R.**—New species in the genera, Anoplius, Pycnopompilus, and Streptosella, N. gen. (Psammoch.). [1] 43: 570–99. **Evans, H. E.**—New species of Pompilinus (Hym., Pompilidae). [43] 23: 84–89, ill. **Flanders, S. E.**—(See under Anatomy.) **Gillespie, D. S.**—Measurements in the worker caste of two species of Eciton (Neivamyrmex Borg.) (Hym., Formici-

dae). [1] 44: 203–04. **Guiglia, D.**—Le Vespe d'Italia (Vespidae). [Mem. Soc. Ent. Ital.] 27 (fasc. suppl.): 5–84. 1948. **Haskins, C. P. and E. F.**—Notes on the method of colony foundation of the ponerine ant Brachyponera (Euponera) lutea Mayr. [73] 57: 1–9. **Hellén, W.**—Zur Kenntnis der Ichneumonidenfauna der Atlantischen Inseln. [Soc. Sci. Fenn., Comm. Biol.] 8 (17): 1–23. **Lewke, J.**—(See under Anatomy.) **Manning, F. J.**—(See under Anatomy.) **Oertel, E.**—(See under Anatomy.) **Pavan, M.**—(See under Anatomy.) **Scott, T. L.**—(See under Anatomy.) **Soika, A. G.**—Studi sui vespidi solitari. Pts. I–VI. [Boll. Soc. Venez. Stor. Nat.] 2: 131–279 (Palearctic and Oriental Eumenes, Nortonia, Odynerus, etc.), 1949. **Smith, M. R.**—On the status of Leptothorax Mayr and some of its subgenera. [73] 57: 29–30. **Utida, S.**—(See under General.) **Wellenius, O. H.**—Die Formiciden von den Azoren und Madeira. [Soc. Sci. Fenn., Comm. Biol.] 8 (19): 1–4. **Williams, F. X.**—The wasps of the genus Solierella in California (Sphecidae, Larrinae). [64] 26: 355–417, ill. **Wilson, E. O.**—Notes on the food habits of Strumigenys louisianae Roger (Form.). [18] 45: 85–86.

Review

MATHEMATICAL BIOPHYSICS. Revised edition. By N. Rashevsky. Chicago: University of Chicago Press. 1948. 669 pp., illus. Price $7.50.

The entomologist who is dealing with fundamental problems is first of all a biologist. He is investigating a special group that is so rich in species as to outnumber all other groups of organisms, with the possible exception of the Protozoa and Bacteria. The entomologist is indeed fortunate to have such a rich variety of working material, for he can not only test established biological principles, but can also formulate new relationships on the basis of his own work.

Since much biological work is dependent on chemistry-physics and mathematics (*sensu lato*, i.e., both quantitative and qualitative), many biologists will be interested in the young science of mathematical biophysics. Unfortunately this science is only in

its infancy at present. It will probably be many years before it has developed to a very satisfactory state. The chief reason why a theoretical biology is expected to grow slowly is the large and heterogeneous mass of largely undigested data that have been accumulated. Portions of these data have been worked out, in many cases quite satisfactorily from the standpoint of theory. However, there is no satisfactory general theory of biology as there is in the case of physics. The section of biology that has the most satisfactory unifying theory is genetics, and it is interesting to note that this science was founded on a partially axiomatic (*sensu* Woodger et al.) basis. The biologist can hardly hope to attain easily a position comparable to that of the present-day physicist because of the vastly more complex situation with which he has to deal. The situation that has been attained in theoretical and experimental physics may be envied by scientists whose houses are not in such fine order, but it must be remembered that it took a number of brilliant minds over a hundred years to arrive at this point. And also the data of physics during this period of development were less numerous and less complex than the mountain of facts and alleged facts which the present-day biologist must begin to organize.

Two main attempts have been made to place biology on a general theoretical basis. The first, the work of J. H. Woodger, is probably more powerful than the present work of Rashevsky. Woodger's book, *The Axiomatic Method in Biology*, Cambridge University Press, 1937, has, however, elicited little or no response. It contains a new and strange tool, and it is, perhaps, because of the natural disinclination of most of us to take the time to master a new and complex method that the book has been so little read. The present work of Rashevsky utilizes a largely quantitative approach to biology. It is hoped that this initial and circumscribed attempt to rationalize biology will ultimately develop to the point of furnishing a fairly satisfactory unifying theory. Such a development is presumably years away because of the complexity and magnitude of the task. Professor Rashevsky and his students are to be congratulated on making a start in this worthwhile endeavor.

To attain the desired goal, *viz.*, a theoretical biology, deductions from which will indicate new and fruitful lines of investigation, a symbolic language must be used. Furthermore any symbolism in order to be useful, must present more than a mere translation from verbal description to symbolic description, some of which is evident in the present work. Symbolic statements of relationships from which significant consequences can be deduced, and later tested by experimentation or observation have the advantage of being relatively free from the semantic difficulties inherent in natural quasi-logical languages. The long history of human thought has adequately demonstrated this point.

The chief basis for Rashevsky's theoretical biology seems to rest on the kinetic theory and not on thermodynamics, which the author has called "thermostatics." He expressed the opinion that at present, at least, he does not intend to use thermodynamics in his work because he considers this tool to be inadequate for open systems. Be that as it may, I seem to recall that J. Willard Gibbs (ca. 1876) wrote a famous paper on the equilibrium of heterogeneous systems. Certainly a phase of a heterogeneous system may be considered as open rather than closed. A recent writer has claimed much to be new, true and interesting about open systems in biology. It is to be hoped that some mathematician will write a critique of his paper, showing how neatly certain unwanted constants and variables were made to do a disappearing act!

The book under consideration contains 54 chapters, which are distributed among four major sections. The titles of the sections are: I. Mathematical Biophysics of Vegetative cells; II. Mathematical Biophysics of Excitation and Conduction in Peripheral Nerves; III. Mathematical Biophysics of the Central Nervous System; IV. The Organism as a Whole and the Organic World as a Whole. Those familiar with the earlier works of the Rashevsky school will immediately see upon examining the present revised edition that it is a composite of the first edition (1938), *Advances and Applications of Mathematical Biology* (1940), and various journal articles, many of which are taken from *The Bulletin of Mathematical Biophysics*. This journal,

a quarterly founded in 1939, is under the editorship of N. Rashevsky.

No doubt a mathematician who picks up this book will think that it has too much obvious detail, and that it is, perhaps, not too rigorous in spots. Many biologists will in all probability maintain that the contrary is true. Any author has a problem in attempting to satisfy readers of various tastes and backgrounds. Professor Rashevsky has apparently attempted a compromise, intended to partially satisfy a variety of readers. It would seem that a biologist whose training has included the calculus and differential equations should not experience too much difficulty in reading this book. In this connection it is unfortunate that in one's mathematical schooling in this country it takes so long to wade through so many totally unedifying topics only to stop just short of the really valuable calculus. This is particularly lamentable in that a reasonably good knowledge of at least the main ideas of the calculus could easily be the end product of a non-engineering curriculum. My own meager knowledge of mathematics was acquired largely outside of school, and then put to good use during two of the war years when I taught in the Mathematics Department (State College, Raleigh, North Carolina. Such a method of outside study in mathematics has certain points in its favor, for one can go as slowly or as rapidly as one's natural laziness and wits dictate! And slow or fast, the game of mathematics is far more entertaining than bridge and good relaxation from real chess.

In summary, I wish to point out that Professor Rashevsky is keenly aware of a number of the limitations of his book. In fact, he goes into a very detailed analysis of a number of them in the preface. The reader will want to examine this part of the book, not only because of Professor Rashevsky's critique of his own work, but because of certain interesting historical details.

This book is recommended to any biologist who is looking for a book about biology that is different.—MERLE W. WING.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Butterflies of New England, principally from New Haven, Conn., for exchange. Louis Clarke, 28 W. Elm St., New Haven 15, Conn.

Wanted—Proc. Ent. Soc. Phila., vols. 1-6; Proc. Cal. Acad. (Nat.) Sci., 1-7; Proc. Acad. Nat. Sci. Phila., 1-8; Trans. Amer. Ent. Soc., 1-5; Bull. Buff. Soc. Nat. Sci., 2-3; Psyche, 11, 13, 15. C. F. dos Passos, Mendham, N. J.

Miridae (Capsidae)—American species wanted, with locality labels, in exchange for British species. D. Leston, F.R.E.S., 6 Frognal Rise, London N. W. 3, England.

Wanted—Entomological microscope in good condition; Spencer, Bausch & Lomb, or other standard make. David G. Shappirio, 4811 17th St., N.W., Washington 11, D. C.

Coleoptera—Large quantities of Cicindelidae, Buprestidae, Lucanidae, Cerambycidae wanted in exchange for all families of Coleoptera from Ill., Ind. and Mo. Joseph B. Hayes, 1905 N. Pulaski Rd., Chicago 39, Ill.

American Sarcophagidae—wanted for identification. H. R. Dodge, 291 Peachtree Street, Atlanta 3, Georgia.

German lepidopterist wishes to correspond and receive live material (eggs and pupae) in exchange for dried imagoes. Johannes Reichel, Koenigsberg, Krs. Wetzlar 16, Germany.

For exchange—The periodic Cicada, T. septendecim. Desire Lepid., espec. Papil., Sphing. & Speyeria. Also Col., espec. Ceramb. & Lucan. John W. Morris, 2704 Genesee St., Syracuse 9, N. Y.

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